Amendment to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Cancelled)

2. (Currently Amended) The device according to claim ~~1~~ 38, wherein said output is configured to display a single blade ~~position~~ elevation value.

3. (Currently Amended) The device according to claim ~~1~~ 2, said controller further comprising ~~a laser guidance apparatus comprising~~:

~~a signal source configured to provide a reference signal to said controller; and~~

~~a plurality of detectors configured to be in signal communication with said source and said controller such that in either said manual or automatic operation, said actuators can move said blade in response to a difference between said reference signal and said blade position~~

at least one user-operable input mechanism to facilitate manual operation of said plurality of detectors; and

an information processor configured to instruct operation of said plurality of detectors.

4. (Currently Amended) A control system for a machine tool, said system comprising:

~~a plurality of actuators configured to move said tool;~~

a signal source;

a plurality of detectors configured to be in signal communication with said signal source such an on-grade reference elevation is established in said plurality of detectors; and

~~a guidance apparatus cooperative with said actuators, said guidance apparatus comprising:~~

~~a signal source;~~

~~a plurality of detectors configured to be in signal communication with said source;~~

and

a controller configured such that upon application of an offset elevation that deviates from said on-grade reference elevation, said controller maintains a substantially constant vertical distance between a cutting edge of said machine tool and a position of said plurality of detectors that corresponds to said on-grade reference elevation, said controller ~~configured to control said plurality of actuators while operating in one of a plurality of operational modes, said controller~~ comprising:

a data interface coupled to said plurality of detectors;

at least one user-operable input mechanism;

an information processor responsive to said input mechanism and said plurality of detectors, said information processor configured to instruct operation of said plurality of detectors; and

an output configured to display ~~information in each of said plurality of operational modes,~~ at least one elevation value corresponding to a position of said machine tool as sensed by at least one of said plurality of detectors ~~said control system configured such that while said controller is in a first of said plurality of operational modes, each of said actuators is driven by said controller independently of one another, while in a second of said plurality of operational modes, said plurality of actuators are responsively linked such that they are driven in unison with one another~~.

5. (Original) The control system according to claim 4, wherein said signal source is an electromagnetic radiation source.

6. (Original) The control system according to claim 5, wherein said electromagnetic radiation source is a laser source.

7. (Currently Amended) The control system according to claim 4, wherein said ~~actuators, while being driven in said second operational mode, are together responsive to a single input into said input mechanism to enable purely translational movement of said tool~~ plurality of detectors are movably mounted to said machine tool.

8. (Cancelled)

9. (Currently Amended) The control system according to claim 7, wherein when said control system is operating in said ~~second~~ linked mode, said output is configured to display a single elevation number corresponding to a position of at least one of said ~~tool~~ plurality of detectors relative to said signal source.

10. (Original) The control system according to claim 4, wherein said information processor is CPU-based.

11. (Cancelled)

12. (Cancelled)

13. (Currently Amended) The control system according to ~~claim 4~~ claim 7, ~~wherein said guidance apparatus~~ further comprisinges a plurality of masts connected to said tool, each said mast coupled to one of said detectors and configured to ~~maintain said detector in said signal communication with said signal source~~ allow the application of an offset to said on-grade reference elevation.

14. (Cancelled)

15. (Cancelled)

16. (Currently Amended) A linked mode ~~blade~~ control system that is responsive to a signal emanating from a signal source, said system configured for use with a machine tool, said system comprising:

~~a plurality of actuators configured to move said a blade at a predetermined slope orientation throughout the substantial entirety of a blade lift travel path; and~~

~~a guidance apparatus cooperative with said actuators, said guidance apparatus comprising:~~

~~a signal source;~~

a first mast mounted to said machine tool, said first mast comprising a first detector disposed thereon, said first detector configured to receive a reference elevation signal from a signal source;

a second mast mounted to said machine tool, said second mast comprising a second detector disposed thereon, said second detector configured to receive said reference elevation signal from said signal source, said second detector spaced apart from said first detector along a length of said machine tool;

~~a plurality of detectors configured to be in signal communication with said source;~~

a controller configured to ~~control said plurality of actuators~~ receive signals from said first and second detectors while said system is operating in said linked mode, said controller ~~comprising:~~ configured to maintain a substantially constant vertical distance between a cutting edge of said blade and said on-grade reference elevation of said first and second detectors while said system is in said linked mode

~~a data interface coupled to said detectors;~~

~~at least one user-operable input mechanism; and~~

~~an information processor responsive to said input mechanism~~; and

an output responsive to said controller and configured to display information in said linked mode ~~such that said information displayed by said output in said linked mode comprises a single elevation number corresponding to a position of said blade within said lift travel path~~.

17. (Currently Amended) The ~~blade control~~ system of claim 16, wherein said ~~predetermined slope orientation of said blade is relative to a laser plane established by said signal source or a user defined offset that has been input into said controller~~ first and second detectors are moveably mounted to said masts.

18. (Currently Amended) An earth-grading apparatus comprising:

a blade;

an assembly configured to move said blade; and

a guidance apparatus cooperative with said assembly, said guidance apparatus comprising:

a signal source;

a plurality of detectors configured to be in signal communication with said signal source such that a signal emanating therefrom is sensed as an on-grade reference elevation by at least one of said plurality of detectors; and

a controller configured to control said assembly while operating in a plurality of operational modes, said controller signally coupled to at least one of said plurality of detectors such that said controller can maintain a substantially constant vertical distance between a cutting edge of said blade and said on-grade reference elevation of said plurality of detectors while said system is in said linked mode, ~~said controller comprising:~~

~~a data interface coupled to said detectors;~~

~~at least one user-operable input mechanism;~~

~~an information processor responsive to said input mechanism; and~~

~~an output configured to display information in either of said plurality of operational modes,~~

~~said apparatus configured such that when said controller is in a first of said plurality of operational modes, each of said actuators is driven by said controller independently of one another, while in a second of said plurality of operational modes, said plurality of actuators are responsively linked such that they are driven in unison with one another~~.

19. (Original) The apparatus according to claim 18, wherein said signal source is a laser source.

20. (Currently Amended) The apparatus according to claim 18, wherein said ~~actuators~~ plurality of detectors~~, while being driven in said second operational mode,~~ are together responsive to a single user input into said input mechanism ~~to enable either purely translational blade movement~~.

21. (Currently Amended) The apparatus according to claim 20, wherein said single user input is an elevation offset~~, said offset defined by a relative position between said blade and a laser plane established by said signal source~~.

22. (Currently Amended) The apparatus according to claim 18, wherein said guidance apparatus further comprises a plurality of masts mounted to said blade, each said mast coupled to one of said plurality of detectors and configured ~~maintain said detector in said signal communication with said signal source~~ to allow the application of an elevation offset to said on-grade reference elevation.

23. (Currently Amended) The apparatus according to claim 22, wherein said masts are ~~longitudinally~~ spaced along a longitudinal dimension of said blade.

24. (Currently Amended) The apparatus according to claim 23, wherein a first of said masts is mounted to ~~a right~~ one side of said blade, and where a second of said masts is coupled to either ~~a left~~ an opposite side or center section of said blade.

25. (Withdrawn) A method of operating an earth-grading apparatus, said method comprising the steps of:

configuring said earth-grading apparatus to include:

a blade;

an assembly configured to move said blade; and

a guidance apparatus cooperative with said assembly, said guidance apparatus comprising a signal source, a plurality of detectors signally coupled to said source, a plurality of masts, each coupled to one of said detectors and configured to facilitate signal communication between said detector and said signal source, and a controller configured to control said assembly while operating in a plurality of operational modes, said controller comprising:

a data interface coupled to said detectors;

at least one user-operable input mechanism;

an information processor responsive to said input mechanism; and

an output configured to display information in either of said plurality of operational modes;

selecting from a plurality of operational modes available on said system, wherein a first mode enables actuators making up said assembly to be driven by said controller independently of one another, and wherein a second mode enables said actuators to be responsively linked such that they are driven in unison with one another; and

inputting instructions into said input mechanism commensurate with said operational mode.

26. (Withdrawn) The method according to claim 25, wherein said signal source is a laser.

27. (Withdrawn) The method according to claim 26, wherein said step of selecting comprises selecting said second operational mode.

28. (Withdrawn) The method according to claim 27, wherein said step of inputting comprises inputting a single elevational number.

29. (Withdrawn) The method according to claim 28, comprising the additional steps of:

comparing at least one of a laser plane reference elevation established by said laser or a user-defined offset that has been input into said controller to a present elevational position of said blade;

determining whether a deviation exists between said present elevational position of said blade and at least one of said reference elevation or said offset; and

positioning said blade in response to said deviation.

30. (Withdrawn) The method according to claim 29, wherein said comparing, determining and positioning steps are all performed automatically.

31. (Withdrawn) A method of benchmarking an earth-grading apparatus, said method comprising the steps of:

configuring said earth-grading apparatus to include:

a blade;

a plurality of actuators to move said blade; and

a guidance apparatus cooperative with said actuators, said guidance apparatus comprising a signal source, a plurality of detectors signally coupled to said source, and a controller configured to operate in at least a linked mode, said controller comprising:

a data interface coupled to said detectors;

at least one user-operable input mechanism;

an information processor responsive to said input mechanism; and

an output configured to display information in said linked mode;

providing a benchmark at a location accessible to said blade;

positioning said blade substantially on said benchmark;

transmitting a signal with said source;

inputting instructions into said input mechanism; and

receiving said signal with at least one of said detectors until a setpoint is established by at least one of said detectors.

32. (Withdrawn) The method of claim 31, further comprising configuring said guidance apparatus to include a plurality of masts, each coupled to one of said detectors to enable at least translational movement thereof to facilitate said establishment of said setpoint.

33. (Withdrawn) The method of claim 31, wherein said positioning said blade substantially on said benchmark comprises positioning a portion of said blade that is substantially underneath one of said detectors substantially on said benchmark.

34. (Withdrawn) The method of claim 33, wherein said portion of said blade that is substantially underneath one of said detectors is a right side or a left side.

35. (Withdrawn) The method of claim 31, wherein said inputting instructions comprises initiating a search for said transmitted signal by at least one of said detectors.

36. (Withdrawn) The method of claim 31, further comprising displaying on said output a single reference elevation corresponding to either said setpoint or a deviation therefrom.

37. (New) A device for establishing a linked mode of operation for a blade on an earth-moving machine, said device comprising:

a signal source configured to establish an on-grade reference elevation;

a plurality of detectors coupled to said earth-moving machine, said plurality of detectors configured to be in signal communication with said signal source such that at least said on-grade reference elevation is sensed by said plurality of detectors; and

a controller signally cooperative with at least one of said plurality of detectors such that upon application of an offset in said linked mode, said controller maintains a substantially constant vertical distance between a cutting edge of said blade and said on-grade reference elevation of said plurality of detectors.

38. (New) The device according to claim 37, wherein said controller is further configured to permit either manual or automatic operation of said plurality of detectors.

39. (New) The control system according to claim 4, wherein said at least one elevation value corresponding to a position of said machine tool as sensed by at least one of said plurality of detectors comprises at least one of said deviation or said on-grade reference elevation.

40. (New) The control system according to claim 4, wherein said controller is further configured that upon the presence of said deviation, said controller instructs at least one actuator to move said machine tool.

40. (New) The device of claim 37, wherein said plurality of detectors are stationary relative to said machine tool.

41. (Original) The device according to claim 37, wherein said signal source is a laser source.

42. (New) The device of claim 37, wherein said plurality of detectors are moveable in response to an applied offset such that after said application of said offset, said system operates to maintain a substantially on-grade elevation of at least one of said plurality of said detectors.

43. (New) The device of claim 42, wherein elevation of said blade is moveably responsive to said maintenance of said substantially on-grade elevation of at least one of said plurality of said detectors.

43. (New) The system according to claim 16, said controller further comprising:

a data interface coupled to said detectors;

at least one user-operable input mechanism; and

an information processor responsive to said input mechanism and said reference elevation signals received from said first and second detectors, said information processor configured to instruct operation of said first and second detectors.